

Application No. 09/605,085
Response to Office Action of May 12, 2004

AMENDMENTS TO THE CLAIMS:

1. (Previously Presented) A method of maintaining a terrestrial cell site handoff list for an airborne cellular system comprising the steps of:

maintaining a fixed beam pattern of one or more communications beams transmitted from an airplane relative to terrestrial cellular system users, each of the one or more communication beams supporting cellular communications for terrestrial cellular system users, all of the one or more beams covering a footprint on the ground;

determining a location and heading of the airplane;

determining locations of each of the one or more communication beams transmitted from the airplane based on airplane flight pattern data;

determining locations of respective terrestrial cell sites within a vicinity of the footprints of each of the one or more beams transmitted from the airplane; and

calculating a list of viable handoff terrestrial cell site candidates for handoffs of a terrestrial mobile user between one or more communication beams and terrestrial cell sites based on maintaining a fixed communication beam pattern, the location and heading of the airplane, the locations of each of the one or more communication beams transmitted from the airplane based on airplane flight pattern data, and the locations of respective cell sites.

2. (Previously Presented) The method of claim 1, wherein the determining of a location and heading of the airplane comprises receiving a flight pattern location of the airplane via a telemetry link.

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3. (Previously Presented) The method of claim 1, wherein the step of calculating a list of viable handoff terrestrial cell site candidates comprises mapping data generated from the steps of maintaining a fixed communication beam pattern, determining a location and heading of the airplane, determining locations of each of the one or more communication beams transmitted from the airplane based on airplane flight pattern data, and determining locations of respective cell sites to a cell site location database to determine the viable handoff terrestrial cell site candidates.

4. (Original) The method of claim 1, further comprising ranking each of the viable handoff terrestrial cell site candidates based on associated probability data found during the calculating of a list of viable handoff terrestrial cell site candidates.

5. (Original) The method of claim 4, wherein a number of the viable handoff terrestrial cell site candidates found during the calculating of a list of viable handoff terrestrial cell site candidates is protocol-dependent.

6. (Previously Presented) The method of claim 1, wherein the calculating of a list of viable handoff terrestrial cell site candidates for handoffs of a terrestrial mobile user between one or more communication beams and terrestrial cell sites is performed for each of the one or more communication beams transmitted from the airplane.

7. (Previously Presented) The method of claim 6, further comprising dividing up the list of viable handoff terrestrial cell site candidates into multiple candidate groups according to

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candidate geographic locations within each of the one or more communication beams transmitted from the airplane; and

cycling through the multiple candidate groups to further reduce the list of viable handoff terrestrial candidates based on the multiple candidate groups.

8. (Canceled)

9. (Original) The method of claim 1, further comprising updating the list of viable handoff terrestrial cell site candidates as a function of time as the airplane flight pattern data changes.

10. (Original) The method of claim 1, wherein the calculating of a list of viable handoff terrestrial cell site candidates is performed to compensate for airplane flight pattern changes caused by adverse weather conditions.

11. (Original) The method of claim 1, further comprising calculating viable airplane beams for receiving handoffs from terrestrial cell sites; and
creating an airplane beam handoff list based on the calculating of viable airplane beams.

12. (Original) The method of claim 1, further comprising dividing the list of viable handoff terrestrial cell site candidates into time-sensitive candidates and non-time-sensitive handoff candidates.

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13. (Previously Presented) In a cellular communications system having an airborne repeater supporting cellular communications of terrestrial mobile users, an apparatus for calculating a list of terrestrial cell site handoff candidates, comprising:

a receiver for receiving airplane flight pattern information; airplane beam pattern information regarding geographic coverage of communications beams transmitted from the airplane and terrestrial cell site location information;

a database for storing handoff coordination information; and

a processor coupled to the receiver and operable to calculate the handoff candidate list based on the information received by the receiver and stored in the database to enable terrestrial mobile users' calls to be handed off from the communications beams transmitted from the airplane to terrestrial cell sites.

14. (Original) The apparatus of claim 13, wherein the flight pattern information comprises airplane location, heading, and beam footprint information.

15. (Original) The apparatus of claim 13, wherein the receiver, the database and the processor are implemented in a ground-based base transceiving station.

16. (Original) The apparatus of claim 13, wherein the receiver, the database and the processor are implemented in the airplane and communicate with a ground-based control station via a telemetry link.

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17. (Original) The apparatus of claim 13, wherein the handoff candidate list includes cell sites within a single communications beam.

18. (Original) The apparatus of claim 13, wherein the processor is for dividing each of the communications beams into groups of cell sites within each of the communications beams and for cycling through the groups of cell sites to further reduce the handoff candidate list.

19. (Original) The apparatus of claim 13, wherein the processor is further for calculating a handoff list for terrestrial cell sites to candidate communications beams.

20. (Canceled)

21. (Previously Presented) The method of claim 1 wherein calculating a list of viable handoff terrestrial cell site candidates further comprises using the relative density of each of the viable handoff cell site candidates to rank the list.

22. (Previously Presented) The apparatus of claim 13 wherein the handoff candidate list is ranked by the relative density of each handoff candidate on the handoff candidate list.